

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Hydrogen Fluoride (Anhydrous) **CHEMICAL FORMULA:** HF **PRODUCT CODE:**

COMPANY NAME:

PELCHEM: The Chemical Division of NECSA

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2. COMPOSITION/INFORMATION ON INGREDIENTS

CHEMICAL NAME OF SUBSTANCE: Hydrogen Fluoride (Anhydrous) **SYNONYMS:** Hydrofluoride (Anhydrous); HF>99.9%

UN No: 1052 **CAS-No:** 7664-39-3

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Very toxic by inhalation, in contact with skin and if swallowed. Causes severe burn. Inhalation of vapours in high concentration may cause shortness of breath (lung oedema). Ingestion causes burns of the upper digestive and respiratory tracts. Will penetrate skin and attack underlying tissues and bone. Risk of serious damage to eyes.

4. FIRST AID MEASURES

GENERAL ADVICE:

Remove from exposure, lie down. Show this safety data sheet to the doctor in attendance.

INHALATION:

Remove from exposure, lie down. Consult a physician. Oxygen or artificial respiration is needed. Observe patient for 24 hours for possible delayed symptoms such as delayed pulmonary oedema.

SKIN CONTACT:

Wash off immediately with plenty of water for at least 15 minutes. Take all contaminated clothing off immediately. Consult a physician. The use of calcium gluconate paste may be considered.

EYE CONTACT:

Rinse thoroughly with plenty of water for at least 30 minutes keeping eyes wide open.
Consult a physician

INGESTION:

Do not induce vomiting. Administer fluoride-binding substances such as milk. Seek immediate medical attention.

PROTECTION FOR FIRST AIDERS:

Wear suitable protective equipment. Avoid direct contact with contaminated victim or clothing

5. FIRE-FIGHTING MEASURES

SPECIFIC FIRE-FIGHTING HAZARDS:

Reacts violently with water and can splash acid onto personnel.

SPECIFIC METHODS:

Keep any HF containers or tanks adjacent or involved in a fire cool with water spray, if not leaking.

PROTECTION FOR FIRE FIGHTERS:

Wear a self-contained breathing apparatus and full protective flameproof clothing

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Ensure adequate ventilation. Use personal protective equipment, complete suit protecting against Hydrogen Fluoride (Anhydrous). Evacuate personnel to safe areas. Keep people away from and upwind of spill/leaks.

ENVIRONMENTAL PRECAUTIONS:

Prevent product from entering drains, environment or natural watercourses.
Contaminated ground to be excavated and removed to approved landfill site

METHODS FOR CLEANING UP:

Evaporates: Suppression of fumes with Versicol W25 (Poly Acrylamide). Neutralize residue with calcium hydroxide or slaked lime ($\text{Ca}(\text{OH})_2$) and sodium carbonate or soda ash (Na_2CO_3). Completely neutralised residue can be land filled when in compliance with local regulations.

7. HANDLING AND STORAGE

TECHNICAL MEASURE TO PREVENT USER EXPOSURE

Do not breathe vapours or spray mist. Avoid contact with skin and eyes. Wear self-contained breathing apparatus and a protective suit

TECHNICAL MEASURES TO PREVENT FIRE AND EXPLOSION

Check containers regularly for evidence of blistering

SAFE HANDLING PRECAUTIONS

Use only in area provided with appropriate exhaust ventilation.

TECHNICAL STORAGE MEASURES

Mild steel pressure vessels. Manufactured according to ASME8 or equivalent code.
Regular statutory inspections in compliance with local regulations for pressure vessels.
Flammable Hydrogen gas can be generated.

STORAGE CONDITIONS

Keep container tightly closed in a dry, cool and well-ventilated area.

INCOMPATIBLE PRODUCTS

Reacts violently with water, strong oxidizing agents – metal (when diluted), concrete, glass & ceramics.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

ENGINEERING MEASURES TO REDUCE EXPOSURE:

Ensure adequate ventilation, especially in confined areas. Use compatible materials.

EYE PROTECTION:

Tightly fitting safety goggles and face-shield.

CONTROL PARAMETERS:

OSHA 8Hr TWA $2.5\text{mg}/\text{m}^3$ (3ppm).
STEL 15 min TWA $5\text{mg}/\text{m}^3$ (6ppm).
ACGIH TLV (3ppm). "Ceiling notation"

SKIN AND BODY PROTECTION:

Complete suit with rubber or plastic boots protecting against Hydrogen Fluoride (Anhydrous).

HYGIENE MEASURES:

Avoid contact with skin, eyes and clothing. When using - do not eat, drink or smoke.
Contaminated work clothing should not be allowed out of the workplace. Monitor for fluorides (urine samples).

RESPIRATORY PROTECTION:

<25ppm: Wear a positive-pressure supplied air respirator with face shield.
>25ppm: Wear self-contained breathing apparatus and protective suit against Hydrogen Fluoride (Anhydrous).

HAND PROTECTION:

Hydrofluoric acid-resistant and solvent-resistant gloves. Material: rubber, viton, neoprene.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE

Liquefied gas. Hygroscopic

COLOUR

Gas: white vapour.

Liquid: colourless

pH

Strongly acidic.

BOILING POINT

19.5°C at 1 atm.

MELTING POINT

-83,4°C.

FLASHPOINT

EXPLOSION PROPERTIES (LEL/UEL)

AUTOIGNITION TEMPERATURES

VAPOUR PRESSURE

103kPa at 20°C / 202 kPa at 40°C

VAPOUR DENSITY

DENSITY

975 kg/m³ at 20°C

1100 kg/m³ at 0°C

SOLUBILITY

Very soluble in water.

ODOUR:

Extremely Pungent

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID:

None.

STABILITY:

Substance is stable. Hygroscopic - reacts violently with water.

HAZARDOUS DECOMPOSITION PRODUCTS:

Toxic fluoride compounds in certain reactions.

MATERIALS TO AVOID:

Glass, metals, bases and organic materials.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

LC50/inhalation/1h/mouse = 456ppm.
LCLO/inhalation/7h/rabbit = 260mg/m³

CHRONIC TOXICITY:

May cause fluorosis.

LOCAL EFFECTS:

Very toxic by inhalation, in contact with skin and if swallowed.
Risk of serious damage to eyes. Ingestion causes burns of the upper digestive and respiratory tracts. Causes severe burn.

HUMAN EXPERIENCE:

Will penetrate skin and attack underlying tissues, as HF is a calcium "scavenger" binding with calcium in the bloodstream and bones.

OTHER INFORMATION:

No scientific evidence to suggest that HF is related to Carcinogenicity, Mutagenicity and Reproduction toxicity.

12. ECOLOGICAL INFORMATION:

MOBILITY/PERSISTANCE/DEGRADABILITY/BIOACCUMULATION

Unlikely to persist as natural alkalinity will slowly dissipate the acidity.

ECOTOXICITY:

Acute fish toxicity = 60ppm*/fish/lethal/fresh water (* = time period not specified).

13. DISPOSAL CONSIDERATIONS

SAFE AND PREFERRED DISPOSAL METHODS:

Contact manufacturer.

CONTAMINATED PACKAGING:

Contact manufacturer.

14. TRANSPORT INFORMATION

UN NO: 1052

ADR/RID:

Class: 8;6.1

TREM-CARD: 78

Labels: Corrosive; Poison

Proper shipping name:

Hydrogen Fluoride, Anhydrous

IMDG:**Class:** 8;6.1**Packaging group:** I**MFAG:** 750**IATA:****CLASS:** 8;6.1**IMDG-Labels:** Corrosive**Subrisk:** Poison**EmS:** 8.03**CAO-Labels:** Corrosive**Subrisk:** Poison**Proper shipping name:**

Hydrogen Fluoride, Anhydrous

Can not be transported by air

15. REGULATORY INFORMATION

APPLICABLE REGULATIONS:

Refer to country of destination.

SAFETY AND RISK PHRASES:

According to (National equivalent of EC-Dir.67/548), as amended, the product is labelled as follows:

- T+** : Very Toxic
C : Corrosive
R26/27/28 : Very toxic by inhalation, in contact with skin and if swallowed.
R35 : Causes severe burns.
S7/9 : Keep container tightly closed and in well ventilated area.
S26 : In case of contact with eyes, rinse immediately with plenty of water and seek medical advise.
S36/37/39 : Wear suitable protective clothing, gloves and eye/face protection.
S45 : In case of an accident or if you feel unwell, seek medical advice immediately (show label where possible).

16. OTHER INFORMATION

RECOMMENDED USE:

1. Manufacture of chlorofluorocarbons.
2. Catalyst in the alkylation of petroleum.
3. Catalyst in the manufacture of detergents.
4. Production of uranium hexafluoride (UF₆) used in the nuclear industry.
5. Production of fluoride chemicals.
6. Production of fluorine gas.

REFERENCES:

1. (CED) Chemical Exchange Directory S.A., Geneva, Switzerland.
2. Unpublished Reports, AEC of SA Ltd, Pelindaba, South Africa, 1993.
3. IMDG, SABS 0228, SABS 0229.
4. Hydrogen Fluoride Handling Guidelines, AECI Chloralkali and Plastics LTD, Sasolburg South Africa, April 1989.

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